

MULTIPLE FREQUENCY ANTENNA

DESCRIPTION

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This application is a 371 of PCT/CA03/00446 filed on 03/28/2003.
5 TECHNICAL FIELD:

This invention relates to antennas that are tunable over a range of operating frequencies and is especially applicable to antennas for wireless communications devices.

BACKGROUND ART:

10 Wireless communications devices, which include cellular/mobile telephones, portable telephones, global satellite communications transceivers, paging devices, so-called personal digital assistants, laptop/notebook computers, and so on are proliferating. It is sometimes desirable for antennas of such devices to be capable of operation at different frequencies. For example, as explained in US patent number 6,204,826, cellular/mobile telephones may need
15 to operate within different systems, such as the Global System of Mobile communications (GSM), which typically uses a frequency band from 880 MHz to 960 MHz, and the Digital Communications System (DCS) which typically uses a band between 1710 MHz and 1880 MHz.

Antennas of portable/mobile equipment must be relatively small, so they usually are
20 relatively narrowband. It is known, therefore, to design such antennas to have more than one resonance frequency, facilitating operation in more than one frequency band. Thus, US6,204,826 discloses an antenna comprising a meandering conductive trace formed upon a dielectric substrate. The trace comprises two segments which couple with each other to provide two distinct resonance frequencies. Likewise, US published patent application
25 number 2002/0014996 discloses an antenna having a resonator element to which the signal feed can be connected at different locations according to the frequency range at which the antenna is to operate.

These arrangements are not entirely satisfactory, however. A cellular telephone system might assign different frequencies to different cells and/or users. In a similar manner,
30 a portable domestic telephone might be capable of selecting different channels within a prescribed band for communication with its own base station. In either case, the antenna still must be sufficiently broadband to accommodate the whole of the band concerned, which limits sensitivity and/or range. Wireless systems generally have limited bandwidth, and numbers of users are increasing rapidly, so co-channel interference is a major problem.
35 Consequently, there is a need for an antenna which can provide satisfactory performance over